Investigating the Effects of Size and Shape of Anisotropic Nanostructures on the Molecular Sensor Response

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The photoreversiblity of molecular machine-attached onto anisotropic nanostructures have been studied using optical spectroscopy. For the first time, we have observed an unprecedented 21-nm shift of localized surface plasmon resonance (LSPR) peak of gold nanoprism upon cis to trans isomerization of azobenzenes. The observed shift was a combined effect of energy transfer across the nanostructure and azobenzene molecule and increase in the dielectric environment of the nanostructure. Furthermore, we also investigated the geometrical effects of plasmonic nanostructures by fine-tuning their size and shape on sensitivity of molecular sensors and determined the mechanism underlying LSPR peak shifts. Understanding such mechanism will aid in designing highly efficient sensing platforms for future optoelectronic device fabrication.